

## Remarks

### *A. Status of Application*

The specification has been amended to correct inadvertent typographical errors. Specifically, the term “fission fragment” was corrected to read “photon,” and the unit of measurement “pm” was corrected to read “ $\mu\text{m}$ .” No new matter was added. The mistakes were clear on both accounts when read in context of the specification as a whole. The appropriate corrections were also clear in context of the specification and supported by the specification.

Figure 1 has been amended, incorporating only elements found in the claims and/or the specification. No new matter was added.

Claims 1-7 and 9-33 were pending. Claims 1-7 and 9-33 will be pending upon entry of this paper.

Claims 1-3, 6, 7, 9 and 28-33 were rejected under 35 U.S.C. §112, first and second paragraphs. Claims 1-3, 6, 7, 9 and 28-33 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,524,133 to Neale et al. (hereinafter “Neale”) in view of Gunther et al. and in view of Groom.

### *B. Objection to the Drawings*

Applicant has amended Figure 1, in accordance with the Examiner’s request, to include the fissile material which is labeled as item number 126. Applicant respectfully asserts that the amended drawings are in compliance with 37 C.F.R. § 1.121(d) and that no new matter has been added because the fissile material added to the drawing is described in the specification as originally filed. Although Applicant has complied with the Examiner’s request, for convenience, Applicant respectfully asserts that the fissile material is not an active element of the claims and need not be illustrated in the drawings.

### *C. Response to Arguments*

Applicant respectfully disagrees with the Office’s “Response to Arguments” Section at pages 3-5 of the Action. The Office’s characterization of the specification and the invention is

incorrect and is, apparently, based on the Examiner's erroneous personal opinion. Applicant directs the Examiner to the Specification, which describes embodiments of the invention and asks that the Office refrain from unfounded speculation about what the invention is or is not, as well as capabilities of the invention. Applicant further requests that the Office refrain from attempting to read in elements to the claims that are not found in the plain language of the claims, and likewise are not found in the Applicant's description. Applicant notes that the "Response to Arguments" section is not couched as a rejection of any claims and, accordingly, does not feel that a formal response is required. Rather, Applicant addresses the claim rejections below.

#### *D. Objections to the Specification*

The specification was objected to under 35 U.S.C. § 132(a). Applicant respectfully traverses this objection. Specifically, Applicant asserts that the amendment to the specification does not introduce new matter into the application.

"Amendments to an application which are supported in the original description are NOT new matter." MPEP 2163.07 "...[I]nformation contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter." MPEP 2163.06 Furthermore, "[a]n amendment to correct an obvious error does not constitute new matter where one skilled in the art would not only recognize the existence of error in the specification, but also the appropriate correction." MPEP 2163.07 (citing *In re Odd*, 443 F.2d 1200, 170 USPQ268 (CCPA 1971)).

The amendment in question made the following change to page 6 of the specification:

In the passage of photons through matter, a photon interacts with atoms or nuclei in an energy-dependent way. Specifically, high atomic number (Z) materials tend to absorb higher energy photons, and low Z materials tend to absorb lower energy photons. The invention includes a method and/or apparatus for measuring the attenuation of a photon beam flux, therefore yielding a measure of the density and distribution of the interrogated material. The invention may be used to identify and distinguish high and low density materials concealed within a vessel, including weapons-grade materials such as, for example, uranium, plutonium, or radiation dispersion devices (known as "dirty bombs"). Further, the invention can include using a detector with a natural uranium target to measure the fission fragments induced from photons. In one embodiment, the detector has a high degree of photon-energy selectivity in the range of 10.0 to 20.0 MeV. In another embodiment, the invention includes a photon beam flux monitor including a

detector for resolving photon energies up to about 6 MeV and another detector for resolving ~~fission-fragment~~ photon energies above about 6 MeV. In yet another embodiment, the invention includes using three detectors, each detector being sensitive to a different range of energies. These energy ranges may overlap.

*Submission Under 37 C.F.R. 1.114*, February 19, 2008, pg. 2. Applicant asserts that the amendment to the specification was made to correct an inadvertent typographical error. This error is obvious when viewed in the context of the rest of the specification and the claims as originally filed. Specifically, page 8 of the originally filed specification includes the following description:

**In one embodiment the scintillator paddles 140 are sensitive to photon energies less than about 6 MeV.** In other embodiments, different energy ranges may be desirable.

Still referring to FIG. 1, high-Z detectors may be formed of a grouping of thin scintillator paddles 150. Placed in front of these scintillators may be a thin lead-converter foil 145 for producing electron/positron ( $e^-/e^+$ ) pairs. When a photon strikes the converter 145 (which may be, for example, a tungsten or lead foil), the photon converts into the electron/positron pair. In one embodiment, the thickness of the converter 145 is between about 1% to 5% radiation lengths. Next, the electron and positron travel into the second set of scintillators 150, where they are detected. The  $e^-/e^+$  pairs may be measured, for example, by placing a sweeping dipole magnet (not shown) in between the converter 145 and a bilaterally-symmetric arrangement of the scintillator paddles 150. The  $e^-/e^+$  pairs may also be measured by directly measuring the double ionization peak. In one embodiment, the scintillator paddles 150 are sensitive to photon energies exceeding about 6 MeV. In other embodiments, different energy ranges may be desirable

(*Specification*, pg. 8 lines 18 through pg. 9 line 10). There is a clear discrepancy between the two paragraphs in the specification, because prior to the amendment the paragraph on pg. 6 stated that a detector resolved “fission fragment energies above about 6 MeV,” while the paragraph on pg. 8 stated that the scintillator paddles 150 are sensitive to photon energies exceeding about 6 MeV. Similarly, the new amendment to the paragraph on page 6 is supported by the paragraph beginning on page 8.

Applicant asserts that the amendment to the specification does not introduce new matter as alleged in the Office Action. First, the discrepancy constitutes an obvious typographical error and one skilled in the art would not only recognize the existence of error in the specification, but also the appropriate correction. Second, the amendment to the paragraph includes only information which was contained elsewhere in the specification and claims as originally filed.

Finally, the amendment is supported by the specification, and thus, does not constitute new matter. Therefore, Applicant respectfully requests that the Office withdraw the objection to the specification under 35 U.S.C. § 132(a).

Applicant asserts that the objection described in paragraph 7 of the Action is unclear with regard to form. Specifically, the action does not clearly specify the legal grounds for the objection. Consequently, the Applicant respectfully requests that the Examiner make clear the grounds for the objection to the specification in the next Office Action if it is to be further maintained.

With regard to the substance of the objection outlined in paragraph 7, applicant respectfully disagrees with the Office's assertion that "identifying fissile material within an interrogated vessel" is not enabled in the specification as filed.

"A description as filed is presumed to be adequate, unless or until sufficient evidence or reasoning to the contrary has been presented by the examiner to rebut the presumption." MPEP 2163.04 (citing *In re Marzocchi*, 439 F.2d 220, 224, 169 USPQ 367, 370 (CCPA 1971)). "The Examiner has the initial burden of presenting by a preponderance of evidence why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention defined by the claims." MPEP 2163.04.

Applicant asserts that the Office has failed to meet the evidential burden to support a challenge to the specification, because the Office Action fails to present evidence of why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention *defined by the claims*. Specifically, "distinguishing a fissile material from a non-fissile material with a close atomic number" is not a limitation found anywhere in the claims or the specification. Applicant respectfully reminds the Office that it is impermissible to read limitations into the claims which are not found in the plain language of the claims.

The limitation "distinguishing a fissile material from a non-fissile material with a close atomic number" as asserted by the Examiner is not found in the claims. Applicant asserts that the claimed method is enabled in the specification, and directs the Examiner's attention to pg. 11 of the specification which states:

The PPAD **200** may be tuned to uranium by having the target **210** made of, for example, a thin film of  $^{238}\text{U}$  deposited on one side of an approximately 100  $\mu\text{m}$  thick aluminum foil. The target **210** may also be, for example, an approximately 178 micron thick film of  $^{238}\text{U}$ . In one embodiment, the invention includes using

targets **210** of different materials to tune the PPAD **200** to a corresponding range of energies. The ability to tune the PPAD **200** allows detection of materials of varying atomic numbers.

*Specification*, pg. 11, lines 5-11. This section of the specification in combination with the figures and other descriptions in the specification enable one skilled in the art to perform a method for identifying a fissile material, or more specifically uranium, within an interrogated vessel. Therefore, Applicant respectfully requests that the objection, whatever its grounds, be withdrawn.

*E. Claim Rejections 35 U.S.C. §112*

Claims 1-3, 6, 7, 9 and 28-33 are rejected under 35 U.S.C. §112, first paragraph, as allegedly “failing to disclose Applicant’s subject matter.” Again, with regard to form, this is not a recognizable legal ground for rejection of the claims. Therefore, Applicant respectfully requests that the Examiner provide clear legal grounds for the rejection in the next Office Action if the rejection is to be maintained. Moreover, as described in section C above, the Office has failed to meet its evidentiary burden with regard to the rejection because the rejection relies on limitations not found in the claims or the specification. *See* MPEP 2163.04. “All questions of enablement are evaluated against the claimed subject matter. The focus of the examination inquiry is whether everything within the scope of the claim is enabled.” MPEP 2164.08. The method as described in claim 1 is enabled by Applicant’s disclosure as explicitly outlined in section C above. Therefore, Applicant respectfully requests that Office withdraw the rejection under 35 U.S.C. § 112, first paragraph.

Claims 1-3, 6, 7, 9 and 28-33 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly incomplete for omitting essential steps or essential parameters or elements. The rejection relies on MPEP § 2172.01 for support, which states “A claim which omits matter disclosed to be essential to the invention as described in the specification or in other statements of record may be rejected under 35 U.S.C. 112, first paragraph, as not enabling.” MPEP 2172.01 (citing *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976)). The MPEP further states “In addition, a claim which fails to interrelate essential elements of the invention as defined by applicant(s) in the specification may be rejected under 35 U.S.C. 112, second paragraph, for failure to point out and distinctly claim the invention.” MPEP 2172.01 (citing *In re Venezia*, 530

F.2d 956, 189 USPQ 149 (CCPA 1976); In re Collier, 397 F.2d 1003, 158 USPQ 266 (CCPA 1968)).

Again, the form of the rejection is unclear, because it fails to put Applicant on proper notice of the legal grounds for the rejection. There is no way for the Applicant to determine whether the rejection is based on a theory of alleged lack of enablement or failure to point out and distinctly claim the invention. This informality places additional burden on the Applicant, because it requires Applicant to guess at the appropriate response or respond to both rejections. Therefore, Applicant respectfully requests the Examiner to clearly set forth the legal grounds for the rejection in the next Office Action if the rejection is to be maintained.

With regard to the substance of the rejection, Applicant asserts that the rejection is improper. The Office Action states that the allegedly omitted steps of claim 1 are: "generation of incident photon beam; determination of an energy spectra of the incident photon beam; detection of energy spectra of an emerging photon beam without fissile material, a distinction of a fissile material from a non-fissile material with a close atomic number. The omitted parameters are: energy spectrums of incident photon beam." *Office Action*, April 16, 2008, pg 8.

Applicant traverses the rejection. First, Applicant respectfully asserts that these allegedly essential steps are not present in the specification or in other statements of record. Second, Applicant asserts that the specification and other statements of record do not disclose these elements to be essential to the invention. The elements described in the Office Action appear to be fabricated, or extrapolated from Examiner's personal knowledge. Even, assuming *arguendo*, that it were common knowledge that the steps set forth in the Office Action were essential to the claim, which Applicant asserts is not the case, the rejection would still be improper because the standard for the rejection is based on those elements "disclosed to be essential to the invention as described in the specification or in other statements of record." Stated in other words, the rejection is only properly founded in those elements which the inventor himself admits to being essential to the claim. Applicant asserts that, to the best of his knowledge, he has made no such admission in the specification or in other documents of record. Therefore, the rejection under 35 U.S.C. § 112, second paragraph is improper as to both form and substance, and the Applicant respectfully requests withdrawal of the rejection.

Claims 1-3, 6, 7, 9 and 28-33 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite. The Office Action alleges that 'identification of a drop in photon yield in at

least one of the three signals' is indefinite because [it] can have different interpretations, such as a change of an energy spectrum of incident beam, emission of high energy photon induced by photon interaction with detected material or a change of a spectral transparency of an inspected object." *Office Action*, April 16, 2008, pg. 9. Applicant respectfully disagrees.

"The examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. § 112, second paragraph, is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. ...Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire." MPEP 2173.02. In reviewing a claim for compliance with 35 U.S.C. 112, second paragraph, the examiner is directed to consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope. *Id.* (citing *Solomon v. Kimberly-Clark Corp.*, 55 U.S.P.Q.2d 1279, 1283 (Fed. Cir. 2000)).

With respect to the first alleged interpretation, "a change of an energy spectrum of incident beam," there is no indication in the claims or the specification that the energy spectrum of the incident photon beam would be changed. This extraneous interpretation does not necessarily fall within the scope of the claim as a whole. Moreover, when this limitation is read in the context of the claim as a whole, it is clear that this interpretation is irrelevant. Specifically, the claim is directed to identifying the presence of a fissile material, so detecting "a change of an energy spectrum of incident beam" is irrelevant and not germane to a determination of the definiteness of the claim. This consideration is outside of the scope of the claim as a whole, and should be disregarded.

The remaining two interpretations "emission of high energy photon induced by photon interaction with detected material or a change of a spectral transparency of an inspected object" appear to be communicating similar ideas, although it is not clear how the spectral transparency of an object could change. Therefore, if the rejection is to be maintained, Applicant respectfully requests that the examiner provide a reference that shows that the spectral transparency of an object can change. Regardless, Applicant asserts that this language is not derived from the specification and is not clearly described in the Office Action. In either regard, both of these alleged interpretations seem to be merely alternative restatements leading to the same result, namely, identification of a "photon energy regime identifying the fissile material within the

interrogated vessel,” which is specified in Claim 1. Therefore, Claim 1 is definite with respect to these two alleged interpretations.

Applicant respectfully asserts that the claims meet the requirements of clarity and precision, particularly when read in the full context of the claim as a whole. Therefore, Applicant requests the Office to withdraw the rejection under 35 U.S.C. § 112, second paragraph.

*F. Claim Rejections 35 U.S.C. §103*

Claims 1-3, 6, 7, 9 and 28-33 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neale in view of Gunther and further in view of Groom.

Claim 1 reads in part:

detecting an emerging photon beam within an energy range from about 1 MeV to about 50 MeV from the fissile material with *an array of fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles*, wherein the array of fission-fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles are *sensitive to different ranges of photon beam energy*;

obtaining a first signal from the array of fission-fragment detectors, a second signal from the first set of scintillator paddles, and a third signal from the second set of scintillator paddles, *each signal indicative of photon yield within the different ranges of photon beam energy*; and

*determining a photon energy regime of the emerging photon beam through identification of a drop in photon yield* in at least one of the three signals, the determined photon energy regime identifying the fissile material.

Such features are nowhere disclosed or suggested by the cited art, alone or in combination. Claim 1 was previously amended to incorporate concepts from now-canceled claim 8 involving data analysis. Claim 1 was also previously amended to recite the determination of a photon energy regime through identification of a drop in photon yield, which is supported in the specification at least at page 8, lines 7-10 and page 14, lines 14-17. For further, non-limiting



explanation about the claimed signals and data analysis, please see the specification at page 14, along with Figure 6.

Claim 1 also recites, in part, that the method identifies fissile material “within an interrogated vessel.” Claim 1 also recites that the array of fission-fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles *are arranged sequentially in a direct path of the emerging photon beam such that each receives the emerging photon beam*. These features too overcome the current rejections.

To render a claim unpatentable under 35 U.S.C. § 103, all the claim limitations must be taught by the prior art, M.P.E.P. § 2143.03. Moreover, the Examiner must provide analysis supporting any rationale why a person skilled in the art would combine the prior art to arrive at the claimed invention, and “[such] analysis should be made explicit,” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. \_\_\_\_ (2007). The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness, M.P.E.P. § 2142; *In re Peehs*, 204 U.S.P.Q. 835, 837 (CCPA 1980). As the applied art does not meet all the claim limitations and the Examiner has not provided proper analysis supporting rationale why a person skilled in the art would have combined the applied art to arrive at the claimed invention, a *prima facie* case of obviousness has not been established with respect to the present claims.

*1. Neale does not teach or suggest features of the claims.*

Neale is directed to a method and apparatus for detecting the mean atomic number of a mass of material by subjecting the material to two groups of X-rays: lower-energy X-rays and higher-energy X-rays. *See* Abstract. Neale defines the mean number of lower-energy X-rays transmitted through the material as  $N_A$  and the mean number of the higher-energy X-rays transmitted through the material as  $N_B$ . *See* Abstract; column 2, lines 5-23. Neale then computes the ratio of  $N_A/N_B$  and uses a lookup table to find the average atomic number of the material, based on the ratio. *See* Abstract; column 2, lines 5-23.

Neale does not teach or suggest the use of the three distinct, claimed detection components of amended claim 1: (1) an array of fission-fragment detectors, (2) a first set of scintillator paddles, and (3) a second set of scintillator paddles. Neale describes a thin crystal followed by a low-Z beam hardener followed by a series of high-Z converters that alternate with and are sandwiched by thin crystals. *See* column 3, lines 48-58. The attached affidavit from Dr.

Philip Cole describes several reasons why the system described by Neale does not teach or suggest these elements of claim 1, and further describes why claim 1 is not merely a predictable variation of the system taught by Neale.

Neale also nowhere teaches or suggests the claimed data analysis techniques of amended claim 1: obtaining separate signals for each of the distinct detection components and determining an energy regime through identification of a drop in photon yield in at least one of those signals so that one can ultimately identify the fissile material. Instead, as discussed above, Neale teaches a completely different technique: Neale describes determining the ratio  $N_A/N_B$  (from two X-ray energy groups) and then using a lookup table to correlate to a specific atomic number. *See* Abstract; column 2, lines 5-23.

The Office points to element 22 in Figure 4 of Neale as meeting claim limitations involving the three claimed detection components and the claimed energy ranges. *See* Office Action at page 5. Applicant respectfully points out that this characterization of Neale finds no support and is incorrect. Element 22 of Neale is simply described as a "detector." *See* column 11, line 8. Mentioning a generic detector cannot be found to amount to a disclosure or teaching of the specific and distinct three detection components recited in amended claim 1. Nor does this detector of Neale implicate the specific data analysis techniques recited in amended claim 1.

The Office also characterizes Neale as involving fissile material (*see* Office Action page 5), yet Neale nowhere mentions fissile material (unlike present, amended claim 1). Neale, moreover, nowhere discusses atomic numbers beyond  $Z=14$  (silicon), whereas embodiments of the present application encompassed by the claims are sensitive to Uranium and other high- $Z$  material.

Additionally, nowhere does Neale teach or suggest an array of fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles *arranged sequentially in a direct path of an emerging photon beam such that each receives the emerging photon beam*. Neale, as describe above, involves a distinct concept altogether, and moreover, it appears that a beam may stop in a detector of Neale (preventing any sequential detectors from receiving it), through its particular use of heavy leaded crystals.

As described below, the significant legal and factual shortcomings of Neale are not cured by the secondary references cited by the Office and Applicant therefore respectfully submits that the claims are currently in condition for allowance.

2. *Gunther does not teach or suggest features of the claims.*

Gunther is cited as teaching or suggesting the inclusion of a PPAD detector into the device of Neale. As implicitly recognized by the Office, Gunther lacks any teaching or suggestion concerning the three detection components and/or the data analysis techniques argued above. Additionally, Gunther does not teach or suggest an array of fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles arranged sequentially in a direct path of an emerging photon beam such that each receives the emerging photon beam. Accordingly, even through combination with Gunther, Neale still does not include the elements of amended claim 1, which are argued above.

Moreover, combination with Neale would fundamentally change the principle of operation of Neale, meaning obviousness is not established pursuant to MPEP 2143.01. Specifically, as mentioned above, Neale is directed to a technique that takes a ratio involving **two** X-ray energy regimes. A lookup table then correlates that specific ratio to an atomic number. Inclusion of a PPAD would add at least one other variable beyond the two needed to calculate the ratio  $N_A/N_B$  taught by Neale and would require a different data analysis technique altogether, nowhere taught or suggested by Neale or Gunter (or Groom, discussed below).

3. *Groom does not teach or suggest features of the claims.*

Groom is believed to be cited in an attempt to show that one would have combined the cited references. Groom nowhere teaches or suggests the claim elements argued above. Groom nowhere suggests that one should, or could, utilize the specific detection setup and data analysis techniques presently claimed in amended claim 1, nor does the Office suggest otherwise. Groom's failure to aid in an obviousness position is further highlighted by Neale's clear requirement that **two** X-ray energy regimes be used to form a **ratio** ( $N_A/N_B$ ) that is then used with a lookup table to determine an atomic number. Thus, even in combination with Groom and/or Gunther, Neale does not render obvious the specific, claimed technique that uses three detector components along with specific data analysis techniques. Likewise, the references in combination do not render obvious the features concerning the array of fission-fragment

detectors, the first set of scintillator paddles, and the second set of scintillator paddles arranged sequentially in a direct path of an emerging photon beam such that each receives the emerging photon beam.

#### 4. *Examiner's Personal Knowledge*

On pages 11 and 12, the Office Action states:

The X-ray detectors may be crystals of zinc tungstate or cadmium tungstate in which event the X-ray photons are converted by the crystals into electromagnetic radiation in the visible range and the photons of visible light can be detected and quantified using a photo-electric sensor adapted to generate from the light emitted from the crystal an electric current which can be measured to give a numerical value proportional to the X-ray photon population incident on the appropriate crystal. *As well known in the art of high energy photon detection* (see for example Groom Fig. 24.1) the photon attenuation length for photons with energy up to 50 MeV is below 100g/cm<sup>2</sup> and it is less than for photons with energy 5MeV in a high atomic number Z material. Therefore design (thickness) of **rarer crystal** detector is enough for absorption and detection of photons with energy **up to 50 MeV**. Neale's detectors is capable to detect photon beam within an energy range from about 1MeV to about 50 MeV, which meets claim limitation.

*Office Action*, April 16, 2008, pp. 11-12. This proposed adaption is not found in Neile, Gunther, or Groom. The Office Action includes several similar statements on page 13, each statement starting with the words "there is a common knowledge that." Applicant believes that the Examiner has either relied on personal knowledge, or taken Official Notice, with respect to this matter. Under Rule 37 C.F.R. §1.104(d)(2), the Examiner is hereby requested to provide and make of record an affidavit setting forth his data as specifically as possible for the assertion. Alternatively, under M.P.E.P. §2144.03, the Examiner is hereby requested to cite a reference in support of the assertion. Otherwise the rejection of claim 1 should be withdrawn for failing to teach or suggest every element of claim 1.

Moreover, Applicant respectfully points out that facts for which official notice is taken serve to fill the gaps which might exist in the evidentiary showing and should not comprise the principle evidence upon which a rejection is based, M.P.E.P 2144.03, citing *In re Ahlert*, 165 U.S.P.Q. 418, 420-421 (CCPA 1970).

Applicant knows of no reference that teaches "detecting an emerging photon beam within an energy range from about 1 MeV to about 50 MeV from the fissile material with an array of

fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles, wherein the array of fission-fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles are sensitive to different ranges of photon beam energy,” as claimed by claim 1, or any of the other statements of alleged “common knowledge.” Therefore, Applicant believes that the features are not capable of instant and unquestionable demonstration as being well-known, as required of Official Notice by M.P.E.P. §2144.03(A), citing *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970).

5. *No Motivation to Combine References to Arrive at Claimed Subject Matter*

Although the Office action alleges that there is motivation to combine found in the cited references, Applicant respectfully disagrees. First, since the references fail to teach or suggest every element of claim 1, it is not possible for the references to provide motivation to combine in a way that would lead one of ordinary skill in the art to arrive at the method of claim 1. Specifically, as set forth above, none of the references teach or suggest “detecting an emerging photon beam within an energy range from about 1 MeV to about 50 MeV from the fissile material with an array of fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles, wherein the array of fission-fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles are sensitive to different ranges of photon beam energy,” nor do any of the references teach or suggest “determining a photon energy regime of the emerging photon beam through identification of a drop in photon yield in at least one of the three signals, the determined photon energy regime identifying the fissile material” as recited in claim 1. Indeed, none of the references even hints at detecting an emerging photon beam within the energy range from about 1 MeV to about 50 MeV. Therefore, the references also fail to teach or suggest any motivation to combine references to arrive at the method of claim 1.

“Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S.\_\_\_\_ (2007). Significantly, in the current case, Examiner has not asserted “the simple substitution of one known element for another . . . [therefore] it will be necessary for [the Examiner] to look to interrelated teachings . . . the effects of demands known to the design community or present in

the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements . . . .” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S.\_\_\_\_ (2007). In the Office Action, Examiner has not provided any analysis supporting any rationale why a person skilled in the art would combine Neale, Gunther and Groom to arrive at the method in claim 1. As the Supreme Court held, “[such] analysis should be made explicit.” *Id.* Without this analysis, Examiner has not discharged the burden of establishing a prima facie case of obviousness of claim 1.

Applicant asserts that the statement of motivation found on pg. 14 of the Office Action is conclusory and incorrect. *Office Action*, April 16, 2008, pg. 14. First, the Office Action quotes a line from Neale which states that “Material discrimination arises from the energy dependence of the transmission coefficient being different from different materials.” *Id.* (citing Neale, column 8, lines 7+). Although this assertion describes the field of X-ray imaging generally, it is effectively irrelevant with respect to motivation to combine Neale with Gunther and Groom, because it has nothing specifically to do with the method of claim 1. Next the Office Action paraphrases a section of the MPEP to provide a general ground for an appropriate showing of motivation, but fails to apply those grounds to the cited references or the subject matter of claim 1. Finally, the Office action states “The alleged distinction between the claimed ‘method for identifying fission material’ of the invention and cited prior art does not correspond to any non-obvious claimed limitation. Applicant’s method uses the same steps as in prior arts. Apparatus disclosed by prior Arts combination is capable to perform the Applicant’s method.” Not only is this statement merely conclusive, unfounded in any logical reasoning, it is also erroneous. The method of claim 1 does not use the same steps as any methods either taught or suggested in the prior art separately or in combination. Therefore, Applicant asserts that the Office has failed to make a proper showing of motivation to combine Neale with Gunther and Groom to arrive at the method of claim 1 and therefore failed to meet its burden of establishing a prima facie case of obviousness of claim 1.

Further, the combination of these references is not proper, even following the Supreme Court’s *KSR* decision. For example, the argued combinations would fundamentally change the operating principles of Neale. Stated differently, it can be said that Neale *teaches away* from the Office’s proposed combinations because those combinations (*e.g.*, adding a PPAD) would destroy or modify Neale’s technique of looking up atomic numbers by simply using two

calculated values  $N_A$  and  $N_B$  that are based on interrogation by two different X-ray energy regimes. Any arguments that it would have been obvious to fundamentally change both the detection hardware (Neale does not use the three separate detection components claimed), data analysis techniques (Neale uses a completely different ratio/lookup table analysis), and arrangement of physical components (e.g., to sequentially arrange specific components) to match claim 1 would amount to impermissible hindsight that is not supported by any of the cited references and which does not establish obviousness pursuant to MPEP 2145.

Applicant believes that these remarks fully respond to all outstanding matters for this application. Applicant respectfully requests that the rejections of all claims be withdrawn so the claims may swiftly pass to issuance.

### **Conclusion**

Should the Examiner desire to sustain any of the rejections discussed in this submission, the courtesy of a telephone conference between the Examiner, the Examiner's supervisor, and the undersigned attorney at 512-536-3018 is respectfully requested in advance.

Respectfully submitted,



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